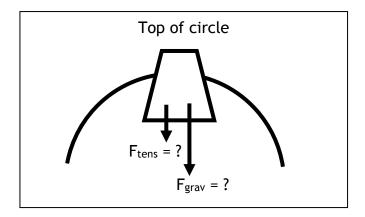
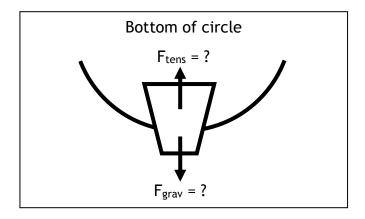
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Lab 007.1 - Exercise: Circular Motion

1) A 1.5 kg bucket of water is tied by a rope and whirled in a circle with a radius of 1 metre. At the top of the circular loop, the speed of the bucket is 4 ms⁻¹. Determine the acceleration, the net force and the individual force values when the bucket is at the top of the circular loop.



2) A 1.5 kg bucket of water is tied by a rope and whirled in a circle with a radius of 1 metre. At the bottom of the circular loop, the speed of the bucket is 6 ms⁻¹. Determine the acceleration, the net force and the individual force values when the bucket is at the bottom of the circular loop.



3) In the hammer throw, a sphere is whirled around in a circular path on the end of a chain. After revolving about five times the thrower releases his grip on the chain and the hammer is launched at an angle to the horizontal.

Assume that the hammer is moving in a circle in a horizontal plane with a speed of 27 ms⁻¹. Assume that the hammer has a mass of 7.3 kg and that it moves in a circle with a 1.25 metre radius. Since the hammer is moving in a horizontal plane, the centripetal force is directed horizontally. The vertical component of the tension in the chain (directed upward) is balanced by the weight of the hammer (directed downward).

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Use the diagram and an understanding of vector components to determine the tension in the chain.

Lab 007.2 - Exercise: Kinetic Energy

- 1) Determine the kinetic energy of a 625~kg car that is moving with a speed of $18.3~ms^{-1}$.
- 2) If the car from question 1 were moving with twice the speed, then what would be its new kinetic energy?
- 3) A 900 kg car moving at 60 kilometres per hour has approximately 125000 Joules of kinetic energy. Estimate its new kinetic energy if it is moving at 30 kilometres per hour.